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Research Article

IN VITRO ANTHELMINTIC ACTIVITY OF HYDROETHANOLIC AND AQUEOUS *SESBANIA SESBAN*, PERS. LEAF EXTRACT AGAINST *MONEIZIA EXPANSA* AND *PARAMPHISTOMES*

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ABSTRACT

Objective: The present study was conducted to validate *in vitro* anthelmintic activity of hydroethanolic and aqueous leaf extract of *Sesbania sesban* against *Moneizia expansa* and *Paramphistomes* by petri-dish method.

Methods: The in vitro trials for anthelmintic activity of hydroethanolic and aqueous leaf extract of *Sesbania sesban* was conducted on mature live *Moneizia expansa* and *Paramphistomes* by petri-dish method. The extracts were used at the concentration of 5 and 10 mg/ml and observation were made on their viability at room temperature.

Results: For *Moneizia expansa,* the hydroethanolic leaf extract of *Sesbania sesban* @ 5 and 10 mg/ml was found to cause caesation of motility (paralysis) after 4:42 and 3:35 hours of exposure while the complete caesation of motility (death) was observed after 5:55 and 5:16 hours of exposure respectively. The aqueous leaf extract causes paralysis after 5:15 and 4:58 hours and death was observed after 7:56 and 7:20 hours of exposure in the concentration of 5 and 10 mg/ml respectively. For *Paramphistomes,* the hydroethanolic leaf extracts cause paralysis after 2:25 and 2:05 hours and death after 5:05 and 4:58 hours of exposure. The aqueous leaf extract causes paralysis after 3:25 and 2:50 hours and death was recorded after 5:38 and 5:22 hours of exposure in the concentration of 5 and 10 mg/ml respectively.

Conclusion: Both the extracts of *Sesbania sesban* were found effective against *Moneizia expansa* and *Paramphistomes* but the hydroethanolic extract was found more effective than aqueous extract.

Keywords: *Sesbania sesban, Moneizia expansa, Paramphistomes,* Hydroethanolic.

INTRODUCTION

Gastrointestinal helminthiasis are arguably an important problem in India causing insidious loss in livestock production with animal mortalities, ill- thrift and the cost of treatments imposing a massive annual cost on livestock owners. Moreover, due to a number of existing and new epidemiological factors favourable to their proliferation, they are increasingly contributing to the burden of human diseases globally but more significantly in developing countries like India. Apart from tropical climate, poor hygiene, lack of sanitation, overcrowding and sharing space with animals, lately new factors of human behavior have directly or indirectly aggravated the status of gastrointestinal helminthiasis (1).

Among various methods of controlling helminthiasis, anthelmintics are used since long to combat the problem of gastrointestinal parasitism. Anthelmintics act either locally or systemically. They expel worms directly from the Gastro intestinal tract (GIT) or destroy helminths that invade organs and tissues. To be an effective anthelmintic, a drug must be able to penetrate the cuticle of the worm or enter its alimentary tract (2).

But continuous, sometimes very frequent and erratic use of anthelmintics has led to the development of parasite resistance and has created ecological imbalances and is one of the major bottlenecks in the treatment of gastrointestinal helminthiasis. Apart from this, the high cost of conventional anthelmintic drugs has paved the way for herbal remedies as an alternative source of anthelmintics.

A large number of plants are naturally available in the Indo- Pak-Bangladesh subcontinent, which possess anthelmintic activities. Many unknown and lesser known plants are used in folk and tribal medicinal practices in India. The medicinal values of these plants are not much known to the scientific world (3). For both developed and less developed countries, recognition and development of herbal medicine offer treatment methods that are more environmentally benign, since they tend to be less toxic, produce fewer unanticipated side effects and apparently do not trigger anthelmintic chemoresistance.

The plant *Sesbania sesban*, commonly known as Shevari in Marathi, belongs to the family Papilionaceae. Traditionally the plant is used to treat inflammatory rheumatic conditions, diarrhea, in excessive menstrual flow, to reduce enlargement of spleen and in skin diseases and is reported to possess anthelmintic, stimulant, astringent, oestrogenic and anti-inflammatory activity (4,5).

So, the present study was conducted to validate in vitro anthelmintic activity of both hydroethanolic and aqueous leaf extract of *Sesbania sesban* against *Moneizia expansa* and *Paramphistomes* by petri- dish method.

MATERIALS AND METHODS

The *in vitro* trials for anthelmintic activity of hydroethanolic and aqueous leaf extract of *Sesbania sesban* was conducted on mature live *Moneizia expansa* and *Paramphistomes* as described briefly (6). The mature worms were collected from the stomach of freshly slaughtered goat from local abattoir, governed by Nagpur Municipal Corporation. The worms were collected by blunt forceps then washed and finally suspended in tyrode solution. The worms were identified from department of Parasitology, Nagpur Veterinary College, Nagpur. These worms were used for screening the anthelmintic activity of extract by petridish method (6).

The activity of extracts was tested at two different dilutions. The extract was diluted to 20 ml of tyrode solution alone and fenbendazole dissolved in tyrode solution was used as negative control respectively. The fenbendazole was used in concentration of 5 mg /ml of tyrode solution. The extract of *Sesbania sesban* was used in the concentration of 5 and 10 mg/ml respectively. Ten worms were exposed in duplicate and the time of transfer was recorded.

Observation were made with test drug at an interval of 30 minutes till the mortality of worms occurred. During observation the time required for paralysis of worm and complete cessation of motility was recorded.

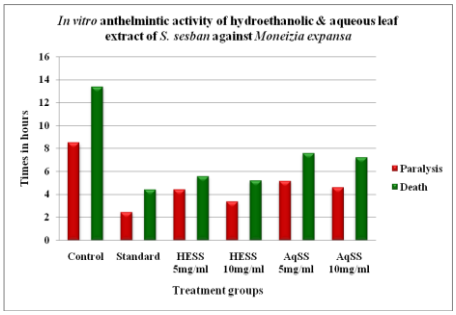
The worms were gently pressed at either end with a blunt glass rod to confirm complete cessation of motility. At the end of trial, the worms were transferred to tyrode solution at 40 ^{0}C to check the motility if any and those worms showing no motility were considered as dead worms (7). The findings were confirmed by taking number of observation. All the experiments were conducted at room temperature varying between 97 ^{0}F to 104 ^{0}F (8).

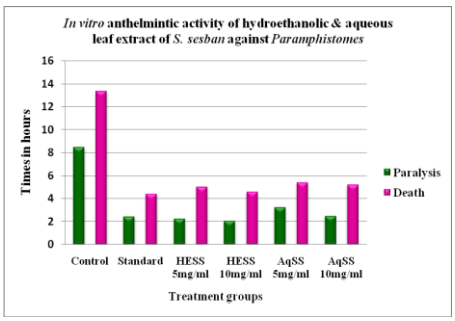
Statistical Analysis

All the values in the test are presented as Means ± SEM. Statistical differences between the means of the various groups were evaluated using FRBD. A 'P' value of less than 5% was considered to be statistically significant ($P < 0.05$). The data generated will be analysed statistically by standard statistical procedure (9).

RESULTS

The anthelmintic activity of hydroethanolic and aqueous leaf extract of *Sesbania sesban* was screened against *Moneizia expansa* and *Paramphistomes* at two different concentration of extracts i.e 5 and 10 mg/ml. The anthelmintic activity was compared with fenbendazole @ 5 mg/ml as referral standard. The time taken for complete ceasation of motility (paralysis) and mortality in hrs in different concentration are presented below. The result reveals that the activity observed was dose dependent. As the concentration was increased paralysis and death occurred and was earlier in the small amount of dose used. The results were significantly observed and were significant at 5 % level of significance.





DISCUSSION

Preliminary phytochemical screening of the extracts revealed the presence of flavonoids, alkaloids, tannins and saponins. It has been well established that fenbendazole by increasing chloride ion conductance of parasite muscle membrane produces hyperpolarization and reduced excitability that leads to muscle relaxation and flaccid paralysis (10,11).

Thus, our drug may have the similar profile of mechanism of action. Further, it has been reported that tannins which are polyphenolic compounds produce antihelmintic activity by binding to glycoprotein on the cuticle of the parasite and thus leads to death of the worm (11).

Therefore, standardization of each extracts and isolation of phyto-constituents in each extracts for antihelmintic activity is required in the future. Furthermore, the pharmacological studies for antihelmintic activity should be undertaken in other parasites to mimic the exact human helminthesis

CONCLUSION

Both the extract of *Sesbania sesban* were found effective against *Moneizia expansa* and *Paramphistomes* but the hydroethanolic extract was found more effective than aqueous extract in a dose dependant manner.The authors acknowledge the department of Veterinary Pharmacology & Toxicology and Dean of NVC to provide the facilities to carry out the experiments.

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